# Complete Summary

## GUIDELINE TITLE

Pulmonary rehabilitation.

## BIBLIOGRAPHIC SOURCE(S)

American Association for Respiratory Care (AARC). AARC clinical practice guideline: pulmonary rehabilitation. Dallas (TX): American Association for Respiratory Care (AARC); 2002. 9 p. [107 references]

## COMPLETE SUMMARY CONTENT



## SCOPE

### DISEASE/CONDITION(S)

- Chronic obstructive pulmonary disease (COPD; chronic bronchitis and/or emphysema)
- Asthma
- Interstitial disease
- Bronchiectasis
- Cystic fibrosis
- Chest wall diseases
- Neuromuscular disorders
- Ventilator dependency
- Lung surgery for transplantation, volume reduction, or cancer
- Any respiratory impairment potentially responsive to the pulmonary rehabilitation techniques available

### GUIDELINE CATEGORY

Evaluation
Rehabilitation

## CLINICAL SPECIALTY

Family Practice
Internal Medicine
Pediatrics
Pulmonary Medicine

## INTENDED USERS

Respiratory Care Practitioners

## GUIDELINE OBJECTIVE(S)

- To improve the consistency and appropriateness of respiratory care and serve as a guide for education and research
- To provide clinical practice guidelines on pulmonary rehabilitation

## TARGET POPULATION

Pediatric, adult, and geriatric patients in whom clear indications for pulmonary rehabilitation are present who possess the necessary cognitive and physical capabilities

These guidelines do not apply to infants or neonates.

## INTERVENTIONS AND PRACTICES CONSIDERED

Pulmonary rehabilitation, including the following components:

1. Assessment of need for pulmonary rehabilitation
2. Patient education
3. Exercise conditioning and techniques
4. Psychological support
5. Monitoring of patient response and clinical monitoring
6. Infection control

## MAJOR OUTCOMES CONSIDERED

- Exercise tolerance
- Utilization of health care resources
- Quality of life
- Survival in patients with chronic obstructive pulmonary disease

# METHODOLOGY

## METHODS USED TO COLLECT/SELECT EVIDENCE

Searches of Electronic Databases

## DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

Not stated

### NUMBER OF SOURCE DOCUMENTS

Not stated

### METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Not stated

### RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Not applicable

### METHODS USED TO ANALYZE THE EVIDENCE

Systematic Review

### DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Not stated

### METHODS USED TO FORMULATE THE RECOMMENDATIONS

Not stated

### RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Not applicable

### COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

### METHOD OF GUIDELINE VALIDATION

Peer Review

### DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

Not stated

## RECOMMENDATIONS

### MAJOR RECOMMENDATIONS

Pulmonary Rehabilitation

Pulmonary rehabilitation is a restorative and preventive process for patients with chronic respiratory disease.

Description/Definition:

Pulmonary rehabilitation has been defined as a "multi-disciplinary program of care for patients with chronic respiratory impairment that is individually tailored and designed to optimize physical and social performance and autonomy."

As lung reserve declines, dyspnea worsens and independent daily activity performance erodes. Pulmonary rehabilitation provides multidisciplinary training to improve the patient´s ability to manage and cope with progressive dyspnea.

Although pulmonary rehabilitation efforts are often focused on patients with chronic obstructive pulmonary disease (chronic bronchitis and/or emphysema), other conditions appropriate for this process include, but are not limited to, patients with asthma, interstitial disease, bronchiectasis, cystic fibrosis, chest wall diseases, neuromuscular disorders, ventilator dependency, and before and after lung surgery for transplantation, volume reduction, or cancer.

Pulmonary rehabilitation services include critical components of assessment, physical reconditioning, skills training, and psychological support. Additional pulmonary rehabilitation services may include vocational evaluation and counseling. The pulmonary rehabilitation program must be tailored to meet the needs of the individual patient, addressing age-specific and cultural variables, and should contain patient-determined goals, as well as goals established by the individual team discipline. Both patients and families participate in this training administered by health care professionals. These pulmonary rehabilitation services are overseen by a medical director to assure appropriate performance by the program staff and to assure proper service delivery.

This guideline is appropriate for pediatric, adult, and geriatric patients in whom clear indications for rehabilitation are present who possess the necessary cognitive and physical capabilities.

Based on the individualized assessment the following areas of education and training should be considered:

- pulmonary anatomy and physiology including the pathophysiology of lung disease
- description and interpretation of medical tests
- bronchial hygiene techniques
- exercise conditioning and techniques which include:
    - breathing retraining
    - endurance, strength, and flexibility training
        - upper extremity
        - lower extremity
    - ventilatory muscle training (its role is still undetermined, since no evidence exists that it contributes to functional improvement when added to a traditional upper and lower extremity exercise training program)
    - energy conservation as it applies to activities of daily living

- indications, actions, and side-effects of medications including non-prescription products, such as vitamins, over-the-counter medications, and herbal remedies
- functional self-management
    - self assessment and symptom management
    - infection control with emphasis on avoidance, early intervention, and immunization
    - environment control
    - indications for seeking additional medical resources
- sleep disturbances, e.g., insomnia and sleep apnea as they relate to chronic lung disease
- sexuality and intimacy
- nutrition
- smoking cessation
- psychosocial intervention and support
- available community services, including patient/family support groups
- advance care planning
- travel issues
- recreation/leisure activities
- stress management
- indications for oxygen, and methods of delivery

Settings:

Pulmonary rehabilitation may take place in, but is not limited to:

- the inpatient setting, including medical center, skilled nursing facility, or rehabilitation hospital
- the outpatient setting
    - outpatient hospital-based clinic
    - comprehensive outpatient rehabilitation facility (CORF)
    - physician´s office
    - alternate or extended care facility
    - patient´s home

Indications:

The indications for pulmonary rehabilitation include the presence of respiratory impairment potentially responsive to the techniques available. Such impairment may be manifested as:

- dyspnea experienced during rest or exertion
- hypoxemia, hypercapnia
- reduced exercise tolerance or a decline in the patient´s ability to perform activities of daily living
- an unexpected deterioration or worsening symptoms against a background of long-standing dyspnea and a reduced but stable exercise tolerance level
- the need for surgical intervention (pre- and postoperative lung resection, transplantation, or volume reduction)
- chronic respiratory failure and the need to initiate mechanical ventilation
- ventilator dependence

- increasing need for acute care intervention, including emergency room visits, hospitalizations, and unscheduled physician office visits

Contraindications:

The initial assessment of the patient should establish his or her willingness to participate in the rehabilitation process. The presence of certain conditions would make successful completion of the rehabilitation process unlikely.

- Potential contraindications to pulmonary rehabilitation include ischemic cardiac disease, acute cor pulmonale, severe pulmonary hypertension, significant hepatic dysfunction, metastatic cancer, renal failure, severe cognitive deficit, and psychiatric disease that interferes with memory and compliance. The decision to provide or withhold pulmonary rehabilitation should be based on a thorough, individualized assessment.
- Substance abuse without the desire to cease use would seriously interfere with successful pulmonary rehabilitation
- Physical limitations such as poor eyesight, impaired hearing, a speech impediment, or orthopedic impairment may require modification of the pulmonary rehabilitation setting but should not interfere with participation in a pulmonary rehabilitation program.

Limitations of Method:

- Patient related
    - The patient may have a disease process that has progressed to the stage where rehabilitation is not possible.
    - The patient may not adhere to or complete the program because it appears to be complicated or because of a sense of hopelessness, depression, or a lack of motivation.
    - The patient/patient family may be reluctant to make changes in their usual program, medications, start new therapy, quit smoking, use supplemental oxygen, or exercise.
    - There might be concerns or limitations in transportation.
    - Financial resources might not be available.
    - The patient may have to stop the program because of an acute exacerbation, or worsening of another medical condition.
- Related to the health care system
    - Reimbursement by intermediaries or third-party payers are not standardized.

Assessment of Need:

- The patient must be under the care of a physician for the pulmonary condition for which he or she needs rehabilitation. Appropriate members of the pulmonary rehabilitation team participate in the patient´s assessment. The initial evaluation should include the medical history; diagnostic tests; current symptoms; physical assessment; psychological, social, or vocational needs; nutritional status; exercise tolerance; determination of educational needs; and the patient´s ability to carry out activities of daily living.
- Areas to be evaluated and reviewed include:
    - effect on quality of life

- pulmonary function assessment, including arterial blood gas analysis
- use of medical resources such as hospitalizations, urgent care/emergency room visits, or physician visits
- exercise ability
- dependence versus independence in activities of daily living
- impairment in occupational performance
- psychosocial problems, such as anxiety or depression
- oxygen saturation at rest, with activity, and possibly during sleep
- co-morbidity
- smoking history
- motivation for rehabilitation, including commitment to spending the time necessary for active program participation.
- current medications
- appropriate blood tests
- electrocardiogram
- chest radiograph
- social support
- potential need for assistive devices, e.g., walker, wheel chair
- adherence to recommended treatment modalities
- physician support available to patient
- availability of transportation and patient/family desire to use what may be available
- financial resources

Resources:

- Personnel

  The number of disciplines contributing to a pulmonary rehabilitation program varies with the size and scope of the pulmonary rehabilitation program and the availability of those disciplines within the setting. Members might include a respiratory care practitioner, registered or licensed nurse, physical therapist, pharmacist, occupational therapist, dietitian, social worker, exercise physiologist, chaplain, speech therapist, and mental health professional. All personnel should be trained in basic life support techniques and, if possible, advanced cardiac life support.

  - Medical director: should be a licensed physician with an interest in and knowledge of pulmonary rehabilitation, pulmonary function, and exercise evaluation.
  - Program director/coordinator: should be trained in health-related profession and have clinical experience and expertise in the care of patients with chronic lung disease. She or he should understand the philosophy and goals of pulmonary rehabilitation and be knowledgeable in administration, marketing, education, patient training, and obtaining reimbursement.
  - Team members: each member should be well-trained in his or her specialty, demonstrate the ability to establish rapport with and convey the necessary knowledge and skills to patients, and have a good working knowledge of the skills of fellow team members. Each team member should be qualified in their area of expertise to access the patient´s needs, provide appropriate intervention, and monitor patient

outcomes. The possession of credentials appropriate to each specialty is recommended, as well as appropriate licensing for each state. Persons responsible for pulmonary function testing, blood gas analysis, exercise testing, and those engaged in any patient educational training concerning needed therapy should demonstrate the knowledge and skills specified in the relevant American Association for Respiratory Care (AARC) Clinical Practice Guidelines. The information and recommendations provided to patients should be evidence-based and consistent across the program. Each team member must be aware of the content of each discipline´s educational content.

- Physical facilities

  The physical area for pulmonary rehabilitation can vary greatly depending upon program structure, patient population, needs, and resources. The site should provide an appropriate environment with adequate space, few interruptions or other distractions, sufficient lighting and temperature control, and comfortable seating. It is essential to have adequate parking and handicap access.

- Patient education materials
  - workbooks and videotapes
  - lung and skeletal models
  - anatomical posters
- Equipment
  - stethoscope
  - manual sphygmomanometer
  - pulse oximeter
  - supplemental oxygen source
  - access to laboratory for arterial blood gas analysis
  - stopwatch
  - calibrated cycle ergometer or motorized treadmill (Measured walking distance may be used if an ergometer or treadmill is not available.)
  - free-weights or elastic bands
  - patient´s own equipment, e.g., metered-dose inhaler and spacer, compressor nebulizer for home use
  - emergency plan and supplies
  - electrocardiogram (EKG) monitoring during exercise, if indicated, and defibrillation and crash cart
  - spirometer
  - peak flow meter

Monitoring:

- Patient: the following should be monitored at baseline and at appropriate intervals to assure validity of results and appropriateness of intervention:
  - patient´s response to progressive and general reconditioning exercises in conjunction with breathing techniques
  - patient´s oxygen requirements at rest and with exercise
  - knowledge and skills acquisition: demonstrations and questionnaires should be used to document evidence of change
  - patient´s subjective comments
  - progress in achieving goals established at baseline

- Patient clinical monitoring during scheduled, supervised session
    - patient appearance
    - vital signs
    - cardiac telemetry, if needed
    - perceived exertion and dyspnea (e.g., use of Borg Scale)
    - Oxygen ($O_2$) saturation via oximeter
- Pulmonary rehabilitation services: each program should establish clinical indicators that objectively measure the information and instruction provided to the patient and should document the outcomes. Content, goal orientation, and applicability should be reviewed on a regular basis.

Frequency:

Training and informational components of pulmonary rehabilitation should be delivered in a systematic manner to assure that all patient care issues are addressed. There should be repetition sufficient to ensure retention of information and skills. Giving the patient too much information at one time may cause confusion. Easy-to-read patient education materials should be used to complement and reinforce verbal instructions. Program schedules vary according to staff, facilities, resources, budget, and patient needs. Pulmonary rehabilitation services are commonly provided over a period of 12 hours per week for 6 or more weeks, governed by the patients individual needs. Patients are encouraged, when possible, to participate in an ongoing maintenance exercise program to sustain the training effect.

Infection Control:

- The staff, supervisors, and physicians associated with the pulmonary rehabilitation program should be conversant with "Guideline for Isolation Precautions in Hospitals" 102 and develop and implement policies and procedures for the program that comply with its recommendations for Standard Precautions and Transmission-Based Precautions.
- The program manager and its medical director should maintain communication and cooperation with the mother institution´s infection control service and the personnel health service to help assure consistency and thoroughness in complying with the institution´s policies related to immunizations, post-exposure prophylaxis, and job- and community-related illnesses and exposures.
- The importance of immunization for influenza and pneumococcal pneumonia, and avoidance of exposure during periods of high incidence of respiratory infections in the community should be stressed to patients. Staff members should receive the influenza vaccination.
- Patients and staff members with signs and symptoms of respiratory infection should avoid contact with patients.
- Adequate handwashing and proper ventilation with prescribed air exchanges should be assured.
- Equipment shared by patients must be cleaned and maintained appropriately. Specific procedures are provided in Static lung volumes: 2001 revision and update (See the related National Guideline Clearinghouse [NGC] summary). Proper cleaning methods for the patient´s personal therapeutic equipment should be regularly reinforced.

Age-Specific Issues:

Instructions should be provided and techniques described in a manner that takes into consideration the learning ability and communications skills of the patient being served.

### CLINICAL ALGORITHM(S)

None provided

## EVIDENCE SUPPORTING THE RECOMMENDATIONS

### TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The type of supporting evidence is not specifically stated for each recommendation.

The guideline is developed from a thorough review of the literature, surveys of current practice, and the expertise of the members of the Working Group.

## BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

### POTENTIAL BENEFITS

Evidence exists for the effectiveness of pulmonary rehabilitation with respect to exercise tolerance, utilization of health care resources, and quality of life. There is some evidence that pulmonary rehabilitation may improve survival in patients with chronic obstructive pulmonary disease (COPD).

### POTENTIAL HARMS

Hazards/complications associated with pulmonary rehabilitation are primarily related to the exercise program. During exercise the cardiovascular and ventilatory systems must be able to respond to increased demands. Exercise can lead to muscle or ligament injuries.

## CONTRAINDICATIONS

### CONTRAINDICATIONS

Potential contraindications to pulmonary rehabilitation include:

- ischemic cardiac disease
- acute cor pulmonale
- severe pulmonary hypertension
- significant hepatic dysfunction
- metastatic cancer
- renal failure
- severe cognitive deficit

- psychiatric disease that interferes with memory and compliance

## IMPLEMENTATION OF THE GUIDELINE

### DESCRIPTION OF IMPLEMENTATION STRATEGY

The effectiveness of pulmonary rehabilitation can best be established by comparing the baseline condition of the patient to his or her condition as a consequence of participation in the pulmonary rehabilitation program and should involve both qualitative and quantitative measures. Such measurements should include:

- indicators of health-related quality of life; including a reduction in dyspnea
- enhanced ability to perform activities of daily living including energy conservation
- increased exercise tolerance and performance
- decreased respiratory symptoms, e.g., frequency of cough, sputum production, wheezing
- increased knowledge about pulmonary disease and its management
- reduced need for medical services including outpatient treatment and hospital admission
- increased ventilator-free time in the ventilator-dependent patient
- return to productive employment

Documentation and data collection can develop information regarding the cost-effectiveness of pulmonary rehabilitation.

The benefit of long-term follow-up, including maintenance programs, should be evaluated.

- educational/recreational support group
- independent maintenance exercise
- scheduled, individualized, on-going exercise/educational input from pulmonary rehabilitation team

## INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

### IOM CARE NEED

Getting Better
Living with Illness
Staying Healthy

### IOM DOMAIN

Effectiveness
Patient-centeredness
Safety

## IDENTIFYING INFORMATION AND AVAILABILITY

### BIBLIOGRAPHIC SOURCE(S)

American Association for Respiratory Care (AARC). AARC clinical practice guideline: pulmonary rehabilitation. Dallas (TX): American Association for Respiratory Care (AARC); 2002. 9 p. [107 references]

### ADAPTATION

Not applicable: The guideline was not adapted from another source.

### DATE RELEASED

2002

### GUIDELINE DEVELOPER(S)

American Association for Respiratory Care - Professional Association

### SOURCE(S) OF FUNDING

American Association for Respiratory Care (AARC)

### GUIDELINE COMMITTEE

Pulmonary Rehabilitation Guideline Committee

### COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

Author: John E. Hodgkin, MD, FAARC, Co-Chair

Names of Committee Members: Lana Hilling CRT, Co-Chair; Phillip D Hoberty, EdD, RRT; Rebecca J Hoberty, RRT; Christine Kelly, MPA, RRT; Trina M Limberg, RRT, FAARC; Kevin Ryan, RRT; Paul A Selecky, MD, FAARC; Dennis C Sobush, MA, PT; Peter A Southorn, MD

### FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

### GUIDELINE STATUS

This is the current release of the guideline.

An update is not in progress at this time.

### GUIDELINE AVAILABILITY

Electronic copies: Available from the American Association for Respiratory Care (AARC) Web site.

Print copies: American Association for Respiratory Care, CPG Desk, 11030 Ables Ln, Dallas, TX 75229-4593.

## AVAILABILITY OF COMPANION DOCUMENTS

None available

## PATIENT RESOURCES

None available

## NGC STATUS

This NGC summary was completed by ECRI on September 17, 2002. It was verified by the guideline developer on October 22, 2002.

## COPYRIGHT STATEMENT



Date Modified: 11/15/2004